

109,167

PATENT



SPECIFICATION

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PROVISIONAL SPECIFICATION.

Improvements in or relating to Apparatus for Drying or Screening Sand and other Granular Substances.

We, JOHN STENNITT BEAN, M.Inst.C.E., and JOHN GORDON BEAN, both of 271, Walthall Street, Crewe, in the County of Chester, Engineer, and Student, respectively, do hereby declare the nature of this invention to be as follows:—

In steam, electric and other locomotives running on smooth rails, sand is employed to increase the adhesion between the driving wheels and the rails. The increased friction induced enables the locomotive to obtain its full tractive effort.

The present invention was designed originally to supply sifted dried sand for this purpose in an economical and effective manner, but it is equally applicable 10 to drying sand and other granular substances for other purposes.

In a locomotive, the sand is carried in a sand box having a valve at the bottom, and a pipe leading to a point close to the rail and immediately in front of the wheel. If the sand be not absolutely dry it cakes in the box, or on the valve, or in the pipe, and is not operative.

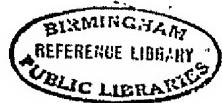
Now our invention consists essentially in an arrangement or device whereby 15 the sand can be brought from a wagon to a supported oscillated sloping dished table and screen over a furnace, or preferably a number of burners burning producer gas and air, preferably on the Bunsen principle.

My invention is best described by setting forth my experimental device. 20 This device is driven by an electric motor, but could be driven by any other convenient power.

The sand is brought by any desired means to a spout or chute which delivers it on to the table provided with a sieve at the lower end, an elevator for instance suspended from above with one leg in the wagon, and the other delivering to 25 the chute can be used, or special wagons can be employed with a screw conveyor delivering the sand on to the table.

The table can be oscillated in any manner at present used for oscillating sieves in milling, the plan I prefer being to suspend it at four points by chain, elastic or spring suspenders, or links, and be oscillated by a continuous or intermittent motion, as for instance a crank, eccentric or segmental toothed gear which shall periodically give it a jerk or pull it in one direction against the action of a spring, and then let it go. The sieve at the lower end of the table allows of the sand of a given fineness to pass through, and fall into a bin or other depositing chamber, while the larger unbreakable lumps of sand, pebbles,

[Price 6d.]



and the like, pass over the tails of the sieve and are deposited in a bunker or in a heap on the floor, to be carried away at leisure.

On the dished table, at intervals, I may place baffle plates, staggered one with the other, so as to increase the length of travel of the sand. Two of the 5
suspenders of the table and sieve can be telescopic or so arranged as to increase or lessen the slope of the sieve as required, and thus the operator can give a different slope when very sticky or moist sand is used from where comparatively dry and friable sand is employed.

The elevator is preferably driven from the same motor that oscillates the 10
table by suitable pulleys and belting.

In conclusion, it is obvious that the details can be very largely varied. In 15
place of burners, hot air or the products of combustion from a producer fed from smoke box refuse, boiler char, cinders, and the like, can be used, or any other fuel, such as town gas, or even sprayed oil, can be employed. We have found that smoke box refuse, which is a waste product in all railways can be burned in a producer, and thus can supply the gas cheaply. Further, the table can be oscillated vertically if desired, or vertically and horizontally at the same time, and thus the material made to dance on the sieve while being steadily gravitated towards the tail.

Further, I can have a combined sieve and table, the sand being dried on a 20
dished or flat table with or without baffles with a screen near the tails for the screenings. The speed of drying can be regulated in any manner, such as by lessening the heat, by regulating the supply of gas and air, or regulating the speed of oscillation.

The brackets connecting the suspension rods, chains or springs to the frame 25
of the machine, and the table, can have sheet asbestos or other heat insulation between them; and the sides of the table, to keep them cool.

The table if desirable can extend nearly to the tails of the machine, and deposit the sand through a grid or slits on to the sieve sloping in the reverse direction, and also oscillated in a similar manner.

Dated the 30th day of November, 1916.

WM. P. THOMPSON & Co.,
Of 6, Lord Street, Liverpool,
Patent Agents for the Applicants.

COMPLETE SPECIFICATION.

Improvements in or relating to Apparatus for Drying or Screening Sand and other Granular Substances.

We, JOHN STENNITT BEAN, M.Inst.C.E., and JOHN GORDON BEAN, both of 40
271, Walthall Street, Crewe, in the County of Chester, Engineer, and Student, respectively, do hereby declare the nature of this invention and in what manner the same is to be performed, to be particularly described and ascertained in and by the following statement:

In steam, electric and other locomotives running on smooth rails, sand is employed to increase the adhesion between the driving wheels and the rails. The increased friction induced enables the locomotive to obtain its full tractive effort.

In a locomotive, the sand is carried in a sand box having a valve at the bottom, and a pipe leading to a point close to the rail and immediately in front of the wheel. If the sand be not absolutely dry it cakes in the box, or on the valve, or in the pipe, and is not operative.

The present invention was designed originally, to supply sifted dried sand for this purpose in an economical and effective manner, but it is equally applicable to drying sand and other granular substances for other purposes.

Various arrangements are known for simultaneously drying and sifting or grading pulverulent material such as sand or stone.

By the present invention an improved self contained apparatus is provided which consists in the combination of an elevator having a part adapted to be lowered into a railway wagon brought adjacent to the apparatus, and a storage bin which receives the material from a shaking screen under which a plurality of heating burners are arranged.

The invention is best described by aid of the accompanying drawings of our experimental device.

In these, Figure 1 is a diagrammatic side elevation or section of our machine, and

15 Figure 2 an end view of the same.

Figure 3 is a side elevation of the heated table suspended by springs.

Figure 4 is an end view of heated table, suspended by springs.

Figure 5 is a plan view of the heated table.

Figure 6 cross section of the gas heating device, and

20 Figure 7 a plan view of the table showing baffle plates fixed on the upper surface.

In this machine is utilized the heat energy of producer gas from smoke box refuse or boiler char under pressure, and burnt in suitable burners shown in Figures 5 and 6 so as to heat the table, but it is obvious that gas from any 25 other suitable substance or sprayed oil might be employed.

In these drawings, 1 is the elevator lifting the sand 2 in the wagon, and passing it down the chute 3 on to the table 4. This table is oscillated in the way hereafter described, and suspended by the rods, chains or the like, 6 and 7, over the heating chamber 5, where it is heated by the rows of gas burners as shown in Figures 1 and 6. On the sides of the hot table are overhung plates, shown more fully in Figure 6 so as to keep in the heat without actually rubbing against the furnace. The suspension rods 6 and 7 can be supplied with right and left hand screws and nuts or otherwise so as to exactly regulate the slope of the table, the suspension rods being hung on trunnion brackets at 9 to the 35 table and at the top end to the framework at 8, packed with asbestos or other suitable heat resisting material.

In Figure 3 are shown a slight variation of this, in which springs 11 are used in place of these rods. They are preferably insulated from the table, and the framework, by asbestos or other suitable heat resisting packings between 40 the flanges of the spring and of the frame and brackets 12 fixed to the table, also packed with heat resisting materials.

Referring now to Figures 1 and 2, 15 is a connecting rod, the lower end of which is enlarged to increase the bearing surface, and is connected to a forked bracket 16 bolted to a bridge piece of flat steel or iron 17, which is bent over 45 at each end, and riveted to the dished sides of the hot table. The end of the connecting rod 15 works on a hardened steel pin passing through the bracket and secured to it by a cotter and tapered split pin or the like. The upper end of the connecting rod 15 is enlarged and arranged to pivot on a crank pin 18 attached to a disc coupling 19 keyed on to a suitable shaft working in bearings 50 fixed on the frame of the machine. On the other end of this shaft is a pulley 20. An electric motor 21 drives this mechanism, and also the elevator pulley 35 by means of belts in the manner shown. The pulley 21 drives the shaft of connecting rod actuating the table as already described.

In the method of actuating the hot table shown in Figures 3 and 4 the spring 55 suspenders 11 are fixed to the frame of the machine so that the hot table stands normally in its highest position. A pinion 13 with one or more teeth as described is keyed on to a shaft on the other end of which is a driving pulley 14

connected in any convenient manner by belting with the electric motor or other convenient source of power such as a gas engine or the like. The single tooth shown on pinion 13 actuates a corresponding tooth on the table, forcing the table downwards against the pressure of the springs which are arranged to always normally keep the table at its highest point until the two teeth passing each other, the table flies back. There are numerous wellknown mechanisms however for oscillating the table, which can be used in place of this, such for instance as a cam or eccentric working against the upper end of the hot table, which would have the advantage of being nearly noiseless. Such a cam or eccentric would be of advantage as having more wearing surface than a crank pin. In either case it would be desirable to fix a counter-weight or counterweights on the driving shaft to counterbalance the connecting rod cam or eccentric disc or sheaves, and the hot table. This is not shown in the drawing as counterweights are wellknown.

In Figures 1 and 2, 24 and 25 show respectively the dried sand and refuse bunkers. 26 and 27 are the drawing off chutes and the opening for them from the bunkers is closed by suitable plate doors arranged to work vertically in slides, and to be operated from outside by any suitable or convenient means. A removable screen 28 is usually fixed at the lower end of the hot table to pass the useable sand down the chute 33 into the sand bunker 24, the tailings passing over the end of the table into the refuse bunker 25. These parts are shown more in detail in Figures 5 & 7. Figure 5 also shows the bridge 17 and bracket 16 to which the connecting rod is attached as already described. The attachments 9 of the suspenders of the table are also shown in this sketch.

Figure 7 shows the hot table provided with angle iron baffle plates at intervals to impede the flow of the sand, and lengthen the time of travel. The baffle plates are riveted to the table, and are marked 30. These baffle plates can be altered in position and number to suit the requirements of the substances under operation.

Having now particularly described and ascertained the nature of our said invention, and in what manner the same is to be performed, we declare that what we claim is:—

1. A device for taking up drying and storing sand consisting in the combination of an elevator movable over and into a wagon or the like adjacent the device, a shaking table arranged over a plurality of heating burners and a storage bin for the dried sand substantially as described.

2. A device as claimed in Claim 1 in which the table has a grid for sifting the material after heating, the sifted material and the tailings being transformed to respective receptacles of the said storage bin substantially as described.

3. A device as claimed in Claim 1 in which the surface of the shaking table is provided with a plurality of baffles to retard progress of the material over it.

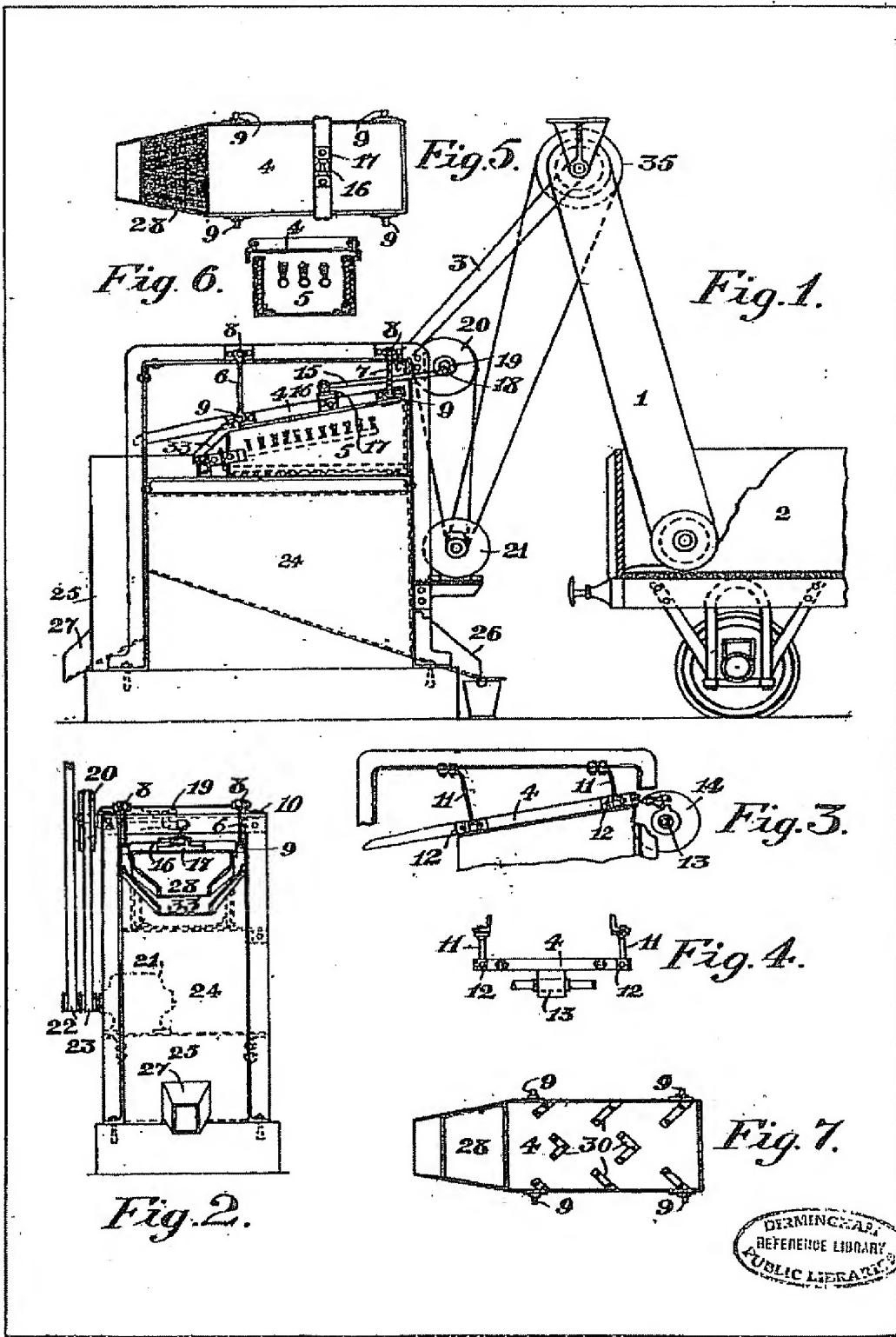
4. The device for drying and screening sand, substantially as herein described and illustrated.

Dated the 11th day of May, 1917.

WM. P. THOMPSON & Co.,
Of 6, Lord Street, Liverpool,
Patent Agents for the Applicants.

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[This Drawing is an introduction of the Original on a reduced scale]



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